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AUXILIARY STORE SELECTING CIRCUIT FOR USE IN COMPUTER SYSTEM WITH MULTIFUNCTION AND SELECTING METHOD THEREFOR

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a computer system, and more particularly, to an auxiliary store selecting circuit in a computer system with multifunction, and its selecting method.

Discussion of Related Art

In general, it is well known and utilized a microcomputer including a personal computer and its workstation, as an information processing system which receives constant information and processes it on the basis of a given procedure and outputs its result. In the computer system provided as a common designation of a hardware in such computer, a software necessary for its operation and an application system concerned with its utilization; a systematic environment such as an operating system and a use language etc. is much various, and its users are also classified into various sorts according to its usage.

Multiplex user system and multitasking system are herein disclosed to meet various requirements of computer system users and are well known in a conventional technique. This multiplex user system is the computer system that several users can use its equipments at the same time, and this multitasking system is the computer system that several works can be executed simultaneously. For example, however, in case one computer system is purchased for one home, there maybe is an environmental difference due to its usage that parent uses one computer and a child uses it. In order to execute a specific work though

they use the same environment, it is needed to install a system environment different from a current using environment. In this case, there is no any settlement in the conventional system. In other words, the computer system of the present time can not well provide multifunction that the above requirements can be satisfied in case that a plural number of users use one computer system in mutually different environments at different time.

A hard disk drive as an auxiliary memory can be installed additionally and a CMOS set-up can be executed, in the conventional computer system, but such installment and execution are almost to extend a capacity of data on the basis of an expert's viewpoint and are the concept different from multifunction in which numerous users can smoothly use the computer system in different environments at different time so as to construct the multifunction.

Therefore it is required a technique through which a plural number of users can smoothly utilize one computer system in mutually different systematic environments at different time. For example, further, parent may work at their desired systematic environment in case data stored in the hard disk drive etc. of the computer system is damaged owing to a mistake use of a child, if the requirements are settled.

Some technique is also required to definitely protect the stored information or data from a hacking or computer virus, in a connective environment between a computer system and a communication network such as an internet, the connective environment is provided according that the communication network is widely spread.

SUMMARY OF THE INVENTION

It is, therefore, a primary object of the present invention to

provide a circuit technique through which several users can smoothly use one computer system in mutually different environments at different time.

Another object of the present invention is to provide an auxiliary store selecting circuit and its selecting method, in which each user can use an independent auxiliary memory to protect the auxiliary memory and information of other users therefrom.

A still another object of the present invention is to provide an auxiliary store selecting circuit and its selecting method, in which a continuous selection for any one hard disc out of numerous hard discs is valid during a power-on just through a manipulation of an external switch in one computer system which has an installment of numerous hard discs for the sake of the construction of multifunction.

A further another object of the invention is to provide an auxiliary store selecting circuit capable of definitely protecting the stored information or data from a hacking or computer virus, in a connective environment between a computer system and a communication network such as an internet.

To achieve the above objects and advantages, in accordance with the present invention, an auxiliary store selecting circuit adequate to a computer system to construct an inventive multifunction comprises a selective switch part for generating a selection signal for selecting one out of numerous auxiliary memories in response to a selective manipulation; a selection maintaining part for maintaining the generated selection signal till a power-off even though there is any selective manipulation after the generation of the selection signal in the selective switch part, and then outputting it; and a selective connection part for performing a connection between the selected

auxiliary memory and a computer main board in response to the output selection signal from the selection maintaining part.

The auxiliary store selecting method in a computer system on which a plurality of auxiliary memories are mounted to construct the multifunction, includes the steps of: generating a selection signal for selecting one out of numerous auxiliary memories in response to a selective manipulation; holding the generated selection signal till a power-off; and performing an electric connection between a computer main board and an auxiliary memory to be selected, in response to the held selection signal.

In such inventive construction one out of a plural number of hard disks in one computer system can be selected to execute the work required by a user, thereby obtaining the construction of multifunction, namely, enabling each user to individually use the auxiliary memory so as to protect auxiliary memories and information of other users therefrom, and further protecting the computer system from the hacking or computer virus even in connecting the computer system to a communication network such as an internet.

BRIEF DESCRIPTION OF THE ATTACHED DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

In the drawings:

Fig. 1 represents a visual diagram of a computer system with

multifunction in accordance with the present invention;

Fig. 2 indicates a block diagram of an auxiliary store selecting circuit in the preferred embodiment of the present invention;

Fig. 3 depicts a detailed circuit diagram showing one embodiment of an auxiliary store selecting circuit in the invention;

Fig. 4 sets forth a connected-pin disposition diagram of a connection part shown in Fig. 2;

Fig. 5 illustrates a detailed circuit diagram showing another embodiment of the auxiliary store selecting circuit shown in Fig. 2; and

Fig. 6 provides a disposition diagram for connected-pins and circuit elements in another embodiment of the connection part shown in Fig. 2.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

The present invention is described in detail as follows, referring to the accompanying drawings which represent an auxiliary store selecting circuit proper to a computer system with multifunction and indicate its selecting method. In the drawings the same or similar functional blocks are indicated by the same or similar reference numbers.

Fig. 1 depicts a visual diagram of a computer system with multifunction in accordance with the present invention. In Fig. 1, the computer system includes a computer main body(10) on which a microprocessor and a main memory are mounted, a plurality of hard disk drives(50,51,52) as the auxiliary memory, floppy disk drives(2,4), an auxiliary store selecting circuit(100) for selecting one out of the hard disk drives(50,51,52), a key board(30) as an input unit, a mouse(40)

and a monitor(20) as a display output unit. A printer etc. as a printing output unit can be also connected thereto through the computer main body(10) and a cable.

In Fig. 1 for the inventive preferred embodiment, the auxiliary store selecting circuit(100) is installed on a substantially upper part of the computer main body(10), and manipulation parts of selective switches(S1,S2,S3) corresponding to respective hard disk drives in a case of three hard disk drives(50,51,52), and front faces of light emitting diodes(LED)(D4,D5,D6) corresponding to the respective selective switches(S1,S2,S3), are seen as the external view thereof, the selective switches being for performing its selection and the light emitting diodes(LED) being for selectively performing luminescence.

Fig. 2 shows a schematic block diagram of an auxiliary store selecting circuit(100) shown in Fig. 1. Referring to Fig. 2, the auxiliary store selecting circuit(100) is composed of a selective switch part(110) for generating a selection signal for selecting one out of a plurality of auxiliary memories in response to a selective manipulation; a selection maintaining part(120) for maintaining the generated selection signal till a power-off even though there is any selective manipulation after the generation of the selection signal in the selective switch part(110), and then outputting it; and a selective connection part(130) for performing a connection between the selected auxiliary memory and a computer main board in response to the output selection signal from the selection maintaining part(120). In the drawing, cables(C1,C2,C3) having numerous connection lines(for example, forty connection lines in a case of forty pins) connect hard disk drives(50,51,52) as the auxiliary memory to a connecter part(135). A cable(C4) takes charge of a connection between the connecter part(135)

and a computer main board(11), and a cable(C5) is provided as four lines in a case of three hard disk drive(50,51,52) and takes charge of a connection between the selective switch part(110) and the connecter part(135).

Fig. 3 sets forth a detailed circuit diagram of one embodiment in the auxiliary store selecting circuit(100) shown in Fig. 2. In case there are three hard disk drives, the selective switch part(110) is composed of three selective switches(S1,S2,S3) having a two-circuit three-key interlocking method. For example, in case a user tries to select a first hard disk drive(50), he selects and presses the selective switch(S1) and then switch nodes N3 and N6 are connected and N2 and N5 are connected, each other. Then switch nodes N1 and N4 are opened each other. A selection signal is generated by such manipulation in the selective switch part(110). Lines HIN28, H1 28, H2 28, H3 28 shown in the selective switch part(110) correspond to the cable(C5) of Fig. 2 and also mean jumper lines as a cable select. A number 28 in the hard disk drive based on a general IDE(Integrated Development Environment) system represents a pin to transmit a signal for recognizing one designated hard disk drive from a microprocessor of a computer.

The selection maintaining part(120) is made up of a flipflop integrated circuit(IC1), resistances (R7,R8,R9,R10,R11,R12,R13), light emitting diodes(D4,D5,D6) and a capacitor(C4) so as to maintain the generated selection signal till a power-off and output it, in case the selective switch part(110) is constructed with three selective switches(S1,S2,S3). Herewith a reference number B+ represents supply voltage of about 5V generally. The light emitting diodes(D4,D5,D6) are indicated as the same reference numbers in the visual diagram of Fig. 1, which is to visually display for the user that the hard disk drive

of what times was currently selected. A latched output selection signal provided from one out of lines(S11,S22,S33) respectively connected between one side ends of the resistances(R10,R11,R13) and respective anodes of the LEDs(D4,D5,D6) is provided as a "high" level. In other words, in case the selective switch(S1) is selected, a high signal is continuously provided during a power-on on the line(S11) among the lines(S11,S22,S33), and a "low" signal is provided on each of the lines(S22,S33). In this case the LED(D4) out of the LEDs(D4,D5,D6) luminesces. The selection signal generated by a latch function of the flipflop integrated circuit(IC1) is maintained till a power-off, even though there is another switch's selective manipulation in a continuous power-on state after the selection signal is first generated by the manipulation of the switch(S1).

In this embodiment, a custom integrated circuit "74LS175" is used as the flipflop integrated circuit(IC1) and the resistances (R7,R8,R9,R10,R11, R12,R13) have each value of 4.7kΩ, 1kΩ,1kΩ, 147Ω,147 Ω,1kΩ and 147Ω. The LEDs(D4,D5,D6) are used as general LEDs, and the capacitor(C4) has a value of 22μF. These elements may be replaced by other equivalent elements if there is other case, and the resistance value and a capacity value can be also changed herein.

The selective connection part(130) for performing a connection between the selected auxiliary memory and the computer main board(11) is composed of resistances(R1,R2,R3,R4,R5,R6), capacitors(C1,C2,C3), transistors(Q1,Q2,Q3), circuit protecting diodes(D1,D2,D3), and relays(RL1,RL2,RL3). In case the high signal is applied onto only the line(S11), only the transistor(Q1) among the transistors(Q1,Q2,Q3) becomes a turn-on state to thus drive only the relay(RL1). Thereby the pin 23 of the hard disk drive HDD1, namely, H1 23, is connected to the

pin 23 of the main board(11), namely, HIN 23, each other, and the pin 25 of the hard disk drive HDD1, H1 25, is connected to the pin 25 of the main board(11), HIN 25, wherein the pin 23 is to provide read data and the pin 25 is to provide write data. Consequently, the pins 23 and 25 of one hard disk drive selected among three hard disk drives are electrically connected with the respective pins 23 and 25 of the computer main board(11). Also the pins 23 and 25 of the hard disk drives not selected are isolated from the respective pins 23 and 25 of the computer main board(11), whereby the desired objects can be obtained.

In this embodiment, the resistances (R1,R2,R3,R4,R5,R6) have each value of 2kΩ, 10kΩ, 2kΩ, 10kΩ, 2kΩ and 10kΩ, and the capacitors(C1,C2,C3) have each a value 22μF. All the transistors(Q1,Q2,Q3) are constructed by each bipolar transistor "2SC1815". All the diodes(D1,D2,D3) are provided as each "1N4148" and all the relays(RL1,RL2,RL3) are provided as each custom 5V 4pin relay. Such elements may be replaced by other equivalent elements in case there exists other case, and the resistance value and the capacity value can be also changed herein.

Fig. 4 illustrates a connected-pin disposition diagram of the connecter part(135) shown in Fig. 2 and shows a disposition state of pins in the connecter part connected with the hard disk drives in case there are three hard disk drives. Each of pins 23,25,28 in a set 4 is electrically isolated one another in an individual connecter, and corresponds to and are connected to a selected pin 3 of HIN through an operation of the relays mounted on the printed circuit board. This pins' disposition is compatible with and applicable to the hard disk drive of the future E(Enhanced)IDE system almost without change.

Another inventive embodiment is described referring to Figs. 5

and 6, as follows.

In another preferred embodiment concerning of Fig. 2, with reference to Fig. 5 it shows a detailed circuit of the auxiliary store selecting circuit(100). The detailed constructive elements of Fig. 5 have a little different points from them shown in Fig. 3, thus the corresponding circuit blocks are represented as similar reference numbers.

Referring to Fig. 5, in case there are three hard disk drives, a selective switch part(110a) is composed of three selective switches(S1A,S1B,S1C) having a two-circuit three-key interlocking method. Herewith the selective switches(S1A,S1B,S1C) correspond respectively to three selective switches(S1,S2,S3) of Fig. 1, with a performance of the same function. For example, in case a user tries to select a first hard disk drive(50), he selects and presses the selective switch(S1A) and then the switch nodes N3 and N6 are connected and N2 and N5 are connected, each other. Then the switch nodes N1 and N4 are opened each other. A selection signal is generated by such manipulation in the selective switch part(110a). In case the selective switch part(110a) is composed of three selective switches(S1A,S1B,S1C), a selection maintaining part(120a) is made up of a flipflop integrated circuit(U1), resistances(R1,R2,R3,R7), light emitting diodes(LED1,LED2,LED3) and a capacitor(C1) so as to maintain the generated selective signal till a power-off and output it. Herewith, operating supply voltage is about 12V. The light emitting diodes(LED1,LED2,LED3) respectively correspond to the LEDs(D4,D5,D6) shown in the visual diagram of Fig. 1, which visually informs the user of which hard disk drive was selected. A latched output selection signal provided from one out of the lines(S11,S22,S33) respectively

connected between one side ends of the resistances(R1,R2,R3) and respective anodes of the LEDs(LED1,LED2,LED3) is provided as a "high" level. In other words, in case the selective switch(S1A) is selected, a high signal is continuously provided during a power-on on the line(S11) among the lines(S11,S22,S33), and a "low" signal is provided on each of the lines(S22,S33). In this case the light emitting diode(LED1) out of the LEDs(LED1,LED2,LED3) luminesces. The selection signal generated by the latch function of the flipflop integrated circuit(U1) is maintained till a power-off, even though there is other switch's selective manipulation in a continuous power-on state after the selection signal is first generated by the manipulation of the switch(S1).

In this embodiment, it is used the flipflop integrated circuit(U1) as a custom integrated circuit "4042", and the resistances(R1,R2,R3,R7) have each value of 1kΩ, 1kΩ, 1kΩ and 4.7kΩ. The LEDs(LED1,LED2,LED3) are used as general LEDs, and the capacitor(C1) has a value of 22μF. Such elements may be replaced by other equivalent elements in case there is other cases, and the resistance value and the capacity value can be also changed herein. A reference number "HPIN" of the selection maintaining part(120a), which is not described here, represents a connecter and takes charge of a connection between lines. The selection maintaining part(120a) operates at about 12V, differently from an operation of the selection maintaining part(120) of Fig. 3 driven by the operating voltage of 5V, therefore an on-resistance in switching is reduced to represent a reduced noise level, which ensures an operational reliability by a definite switching operation.

The selective connection part(130a) for performing a connection between the selected auxiliary memory and the computer main board(11)

is composed of resistances(R8,R9), transistors(Q1,Q2), circuit protecting diodes(D1,D2) and relays(RL1,RL2). In case the high signal is applied onto only the line(S11), only the transistor(Q1) among the transistors(Q1,Q2) becomes a turn-on state to thus drive only the relay(RL1). Whereby the pin 23 of the hard disk drive HDD1, namely, H1.23, is connected to the pin 23 of the main board(11), namely, HIN 23, each other, and the pin 25 of the hard disk drive HDD1, H1 25, is connected to the pin 25 of the main board(11), HIN 25, each other.

Herewith the pin 23 is to provide a read control signal and the pin 25 is to provide a write control signal. Consequently, the pins 23 and 25 of one hard disk drive selected among three hard disk drives are electrically connected with each of the pins 23 and 25 of the computer main board(11), and the pins 23 and 25 of the hard disk drives not selected are isolated from each of the pins 23 and 25 of the computer main board(11), whereby the inventive desired object can be obtained. The resistances(R8,R9) have each value of 6.8kΩ and 6.8kΩ, and all the transistors(Q1,Q2) are constructed as each NPN type bipolar transistor "2SC1815". All the diodes(D1,D2) are provided as each "1N4148" and all the relays(RL1,RL2) are provided as each custom 12V 8pin relay. Such elements may be replaced by other equivalent elements in case there exists other cases, and the resistance value and the capacity value can be also changed herein. The selective connection part(130a) has the small number of elements in its components in comparison with the construction of the selective connection part(130) of Fig. 3, that is, can obtain the compact construction, together with characteristics of a prominent noise immunity and operating voltage of 12V for the sake of an operational reliability.

Fig. 6 provides a disposition diagram for connected-pins and

circuit elements in another embodiment of the connecter part shown in Fig. 2. In Fig. 6, connecters(135-1,135-2,135-3,135-4)are installed to perform the same function as the element 135 of Fig. 4. Reference numbers CN1,CN2,CN3 represent connecters for use of displayer connection, and R1,R2,R3 are connected with the connecters for use of the connection, the connecters being coupled with the LED and all these resistors R1,R2,R3 having a resistance value of 1kΩ. Reference numbers 137 and 138 indicate connecters for use of a power connection. In Fig. 6 a switch block 136 is additionally installed in comparison with the case of Fig. 4. Such additional installment of the switch block(136) settles an inconvenience of operating the jumper wire as the afore-mentioned cable select in achieving the inventive object. That is to say, it is released from an inconvenience of operating the jumper wire to decide a master/slave in the hard disk drive. This switch block(136) is constructed with four switches(SW1-SW4) and each one switch((SW1) among them can be embodied by an integrated circuit element "4066" IC for an IDE control.

In Fig. 6, also, the master can be selectively used through a control of a terminal for use of the IDE(HDD/CD) without needing a manipulation of a user. For example, as the replacement of the main board in which a function of a chip select(C3) is not smoothly supplied in an ATA(AT bus attachment) as a new standard of the IDE, the master/slave can be selectively used to settle the defects. A required hard disk drive can be selectively used by efficiently connecting and cutting off a pin concerned with a detection among IDE pins. In this case, an IRQR(Interrupt Request) of a number 31, a PDIAG of a number 34, a CS0 of a number 37, a CS1 of 38 and a DASP of 39 are additionally controlled. The connection and cutting-off operations is gotten by

maintaining the line of the selected side as an on-state and the line not selected as an off-state through a use of the selection signal in the flipflop.

That is, in case it is decided to need to construct the multifunction by a user in his intension that the computer will be used by other persons including the user himself and several environments need to be built up therein, in purchasing one computer system, the user can purchase and install a plural number of hard disk drives and mount the above-mentioned auxiliary store selecting circuit(100) as shown in Fig. 1. Then, in using it, when only an external switch is simply manipulated and one out of the drives is continuously selected unless a main power switch(6) shown in Fig. 1 is turned off, namely, during a power-on.

According to that, it is available to build up a desired environmental construction by the number of hard disk drives installed, in other words, for example, an OS environment and an environment according to a usage can be distinguished by the respective drives in its construction, wherein the OS environment is such as Win95-98, Win NT, OS/2, Linux, Unix, Win2000, etc. and the environment according to the usage is as game, work and graphic usages, etc. Also the construction can be distinguished according to a plurality of respective users. In such function, each independent work can be done by making one computer to get several kinds of environmental constructions and an advantage like a case that the user uses several computers can be gotten by just installing the hard disk drive. Also in case the computer system is connected to the communication network such as an internet and one specific hard disk among a plurality of hard disks is connected as a communication network usage, data stored in the rest hard disks

is protected from a hacking or computer virus. Thus, the other system can be protected therefrom in case numerous computer systems are connected through the LAN.

Accordingly, in accordance with the present invention, the auxiliary store selecting circuit and its selecting method can be widely applied to a case of a trader or a student studying abroad who uses several languages, and also to cases that numerous users should utilize one computer at home or office, a computer should be utilized for uses of a work, a game, a graphic working and a communication, namely, should be used in a classified working state, and also an emergence hard disk drive is required at places, for example, such as a game room etc. where computers should continuously operate for 24 hours.

In accordance with the present invention, as afore-mentioned, desired works can be separately executed by selecting one out of a plurality of hard disks in one computer system, to thereby obtain the construction of multifunction. In addition, every user can use an independent auxiliary memory to whereby protect the auxiliary memory and information of other users.

Further, in case that the computer system is connected to a communication network such as an internet and one specific hard disk among numerous hard disks is connected thereto as a communication network usage, data stored in the rest other hard disks can be protected from a hacking or computer virus. That is, there is relatively an advantage in a protection of information even though a plural number of computer systems are connected by a local area network(LAN) one another.

Although the invention has been shown and described with respect to the preferred embodiments, it will be understood by those skilled

in the art that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the following claims. For example, only the hard disk drive as the auxiliary memory was herein described as one example but replacement elements such as an EEPROM, a magnetic drum, etc. may be used as the auxiliary memory.